

Tulalip Tribes

Type	Sector	Engine Type	Number of Engines Retrofitted	Model Year	Retrofit Year	Technology Description	Fuel Type	Vehicle Miles Traveled/Year (VMT)	Horsepower	Usage Rate/Year	Unit Cost	Installation Cost	Percent Reduced (NOx, %)	Baseline of Engines Retrofitted per year (NOx, short tons/year)	Amount Reduced per Year(NOx, short tons)	Lifetime Baseline of Engines Retrofitted (NOx, short tons)	Lifetime Amount Reduced (NOx, short tons)	Lifetime Amount Emitted After Retrofit, Retrofitted Engines (NOx, short tons)	Capital Cost Effectiveness \$(short ton), Retrofitted Engines (NOx)	Percent Reduced (PM2.5, %)	Baseline of Engines Retrofitted per year (PM2.5, short tons/year)	Amount Reduced per Year(PM2.5, short tons)	Lifetime Baseline of Engines Retrofitted (PM2.5, short tons)
Marine Vessels	Commercial Fishing	Propulsion	1	1996	2018	Engine Replacement - Diesel	ULSD		65		\$31,120	\$23,750	-57%	0.3837	-0.2187	0.3837	-0.2187	0.6024	50.00	45%	0.0121	0.0054	0.0121

Lifetime Amount Reduced (PM2.5, short tons)	Lifetime Amount Emitted After Retrofit, Retrofitted Engines (PM2.5, short tons)	Capital Cost Effectiveness (\$/short ton), Retrofitted Engines (PM2.5)	Percent Reduced (HC, %)	Baseline of Engines Retrofitted per year (HC, short tons/year)	Amount Reduced per Year(HC, short tons)	Lifetime Baseline of Engines Retrofitted (HC, short tons)	Lifetime Amount Reduced (HC, short tons)	Lifetime Amount Emitted After Retrofit, Retrofitted Engines (HC, short tons)	Capital Cost Effectiveness (\$/short ton), Retrofitted Engines (HC)	Percent Reduced (CO, %)	Baseline of Engines Retrofitted per year (CO, short tons/year)	Amount Reduced per Year(CO, short tons)	Lifetime Baseline of Engines Retrofitted (CO, short tons)	Lifetime Amount Reduced (CO, short tons)	Lifetime Amount Emitted After Retrofit, Retrofitted Engines (CO, short tons)	Capital Cost Effectiveness (\$/short ton), Retrofitted Engines (CO)	Percent Reduced (CO2, %)	Baseline of Engines Retrofitted per year (CO2, short tons/year)	Amount Reduced per Year(CO2, short tons)	Lifetime Baseline of Engines Retrofitted (CO2, short tons)	Lifetime Amount Reduced (CO2, short tons)	Lifetime Amount Emitted After Retrofit, Retrofitted Engines (CO2, short tons)	Capital Cost Effectiveness (\$/short ton), Retrofitted Engines (CO2)
0.0054	0.0067	\$10,075,649.48	-7%	0.011	-0.0008	0.011	-0.0008	0.0117	\$0.00	-104%	0.0658	-0.0684	0.0658	-0.0684	0.1342	\$0.00	40%	10.125	4.05	10.125	4.05	6.075	\$13,548.15

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Marine Vessels	Commercial Fishing	Propulsion	1	2007	2018	Engine Replacement - Diesel	ULSD		435		\$44,196	\$30,000	30%	2.4457	0.7337	29.348	8.8044	20.5436	\$8,427.14	60%	0.0773	0.0464	0.9273

Lifetime Amount Reduced (PM2.5, short tons)	Lifetime Amount Emitted After Retrofit, Retrofitted Engines (PM2.5, short tons)	Capital Cost Effectiveness (\$/short ton), Retrofitted Engines (PM2.5)	Percent Reduced (HC, %)	Baseline of Engines Retrofitted per year (HC, short tons/year)	Amount Reduced per Year(HC, short tons)	Lifetime Baseline of Engines Retrofitted (HC, short tons)	Lifetime Amount Reduced (HC, short tons)	Lifetime Amount Emitted After Retrofit, Retrofitted Engines (HC, short tons)	Capital Cost Effectiveness (\$/short ton), Retrofitted Engines (HC)	Percent Reduced (CO, %)	Baseline of Engines Retrofitted per year (CO, short tons/year)	Amount Reduced per Year(CO, short tons)	Lifetime Baseline of Engines Retrofitted (CO, short tons)	Lifetime Amount Reduced (CO, short tons)	Lifetime Amount Emitted After Retrofit, Retrofitted Engines (CO, short tons)	Capital Cost Effectiveness (\$/short ton), Retrofitted Engines (CO)	Percent Reduced (CO2, %)	Baseline of Engines Retrofitted per year (CO2, short tons/year)	Amount Reduced per Year(CO2, short tons)	Lifetime Baseline of Engines Retrofitted (CO2, short tons)	Lifetime Amount Reduced (CO2, short tons)	Lifetime Amount Emitted After Retrofit, Retrofitted Engines (CO2, short tons)	Capital Cost Effectiveness (\$/short ton), Retrofitted Engines (CO2)
0.5564	0.3709	\$133,349.64	51%	0.0993	0.0201	0.4718	0.2406	0.2312	\$308,334.20	2%	0.5859	0.0117	7.0303	0.1406	6.8897	\$527,686.05	13%	84.375	10.9688	1,012.50	131.625	880.875	\$563.69

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Marine Vessels	Commercial Fishing	Propulsion	1	1996	2018	Engine Replacement - Diesel	ULSD		225		\$43,867	\$8,475	55%	0.2143	0.1179	0.2143	0.1179	0.0964	\$444,106.47	34%	0.0016	0.0006	0.0016

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0.0006	0.0011	\$94,867,410.43	65%	0.0054	0.0035	0.0054	0.0035	0.0019	\$15,031,295.87	39%	0.0348	0.0136	0.0348	0.0136	0.0212	\$3,854,178.43	40%	27	10.8	27	10.8	16.2	\$4,846.48

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Marine Vessels	Commercial Fishing	Propulsion	1	1977	2018	Engine Replacement - Diesel	ULSD		200		\$43,867	\$8,475	51%	0.6746	0.3441	0.6746	0.3441	0.3306	\$152,133.36	-11%	0.0034	-0.0004	0.0034

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-0.0004	0.0038	50.00	61%	0.0169	0.0103	0.0169	0.0103	0.0066	\$5,087,738.53	31%	0.1096	0.034	0.1096	0.034	0.0756	\$1,540,208.69	40%	95.625	38.25	95.625	38.25	57.375	\$1,368.42

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Marine Vessels	Commercial Fishing	Propulsion	1	2002	2018	Engine Replacement - Diesel	ULSD		420		\$44,196	\$30,000	-19%	2.875	-0.5463	2.875	-0.5463	3.4213	\$0.00	30%	0.0872	0.0262	0.0872

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0.0262	0.0611	\$2,835,585.32	54%	0.0833	0.045	0.0833	0.045	0.0383	\$1,648,772.27	-111%	0.5417	-0.6013	0.5417	-0.6013	1.1429	\$0.00	26.68%	28.125	7.5038	28.125	7.5038	20.6213	\$9,887.86

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Marine Vessels	Commercial Fishing	Propulsion	1	1996	2018	Engine Replacement - Diesel	ULSD		210		\$43,867	\$8,475	52%	1.7917	0.9317	1.7917	0.9317	0.86	\$56,180.09	79%	0.0457	0.0361	0.0457

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0.0361	0.0096	\$1,449,378.87	63%	0.0448	0.0282	0.0448	0.0282	0.0166	\$1,854,834.80	34%	0.2912	0.099	0.2912	0.099	0.1922	\$528,753.81	40%	22.5	9	22.5	9	13.5	\$5,815.78

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Marine Vessels	Commercial Fishing	Propulsion	1	1991	2018	Engine Replacement - Diesel	ULSD		200		\$45,307	\$11,475	50%	0.7937	0.3968	0.7937	0.3968	0.3968	\$143,088.23	78%	0.02	0.0156	0.02

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0.0156	0.0044	\$3,631,425.90	61%	0.0198	0.0121	0.0198	0.0121	0.0077	\$4,691,417.48	31%	0.129	0.04	0.129	0.04	0.089	\$1,420,230.60	40%	11.25	4.5	11.25	4.5	6.75	\$12,618.22

[illegible]

Amount Reduced per Year(\$C, short tons)	CRUISE 2000-01 of Engines Retrofitted (\$C,	Lifetime Amount Reduced (\$C, short tons)	CRUISE 2000-01 Engines After Retrofit (\$,	CRUISE 2001 Retrofits (\$/short ton),	Annual Reduction of Engines (CO ₂ , short tons)	Lifetime Reduction of Engines (CO ₂ , short tons)	Percent Reduced (CO ₂ , %)	Amount of Engines Retrofitted per year (CO ₂ , short tons)	Amount Reduced per Year(\$C, short tons)	Lifetime Reduction of Engines Retrofitted (CO ₂ , short tons)	Lifetime Amount Reduced (CO ₂ , short tons)	Lifetime Amount Reduced After Retrofit, Retrofitted Engines (CO ₂ , short tons)	Capital Cost Effectiveness (\$/short ton), Retrofitted Engines (CO ₂	Annual Reduction of Engines (CO ₂ , short tons)	Lifetime Reduction of Engines (CO ₂ , short tons)	Percent Reduced (CO ₂ , %)	Reduction of Engines Retrofitted per year (CO ₂ , short tons/year)	Amount Reduced per Year(\$C, short tons)	Lifetime Reduction of Engines Retrofitted (CO ₂ , short tons)	Lifetime Amount Reduced (CO ₂ , short tons)	Lifetime Amount Reduced After Retrofit, Retrofitted Engines (CO ₂ , short tons)	Capital Cost Effectiveness (\$/short ton), Retrofitted Engines (CO ₂
0.02213	0.0510	0.0221	0.0206	\$1,210,000.00	0.00942834	0.00942834	94	0.0094	0.0084	0.0094	0.0084	0.0071	\$87,177.00	234	234	0.126	234	36.1767	234	20.1702	395.4228	\$1,097.34